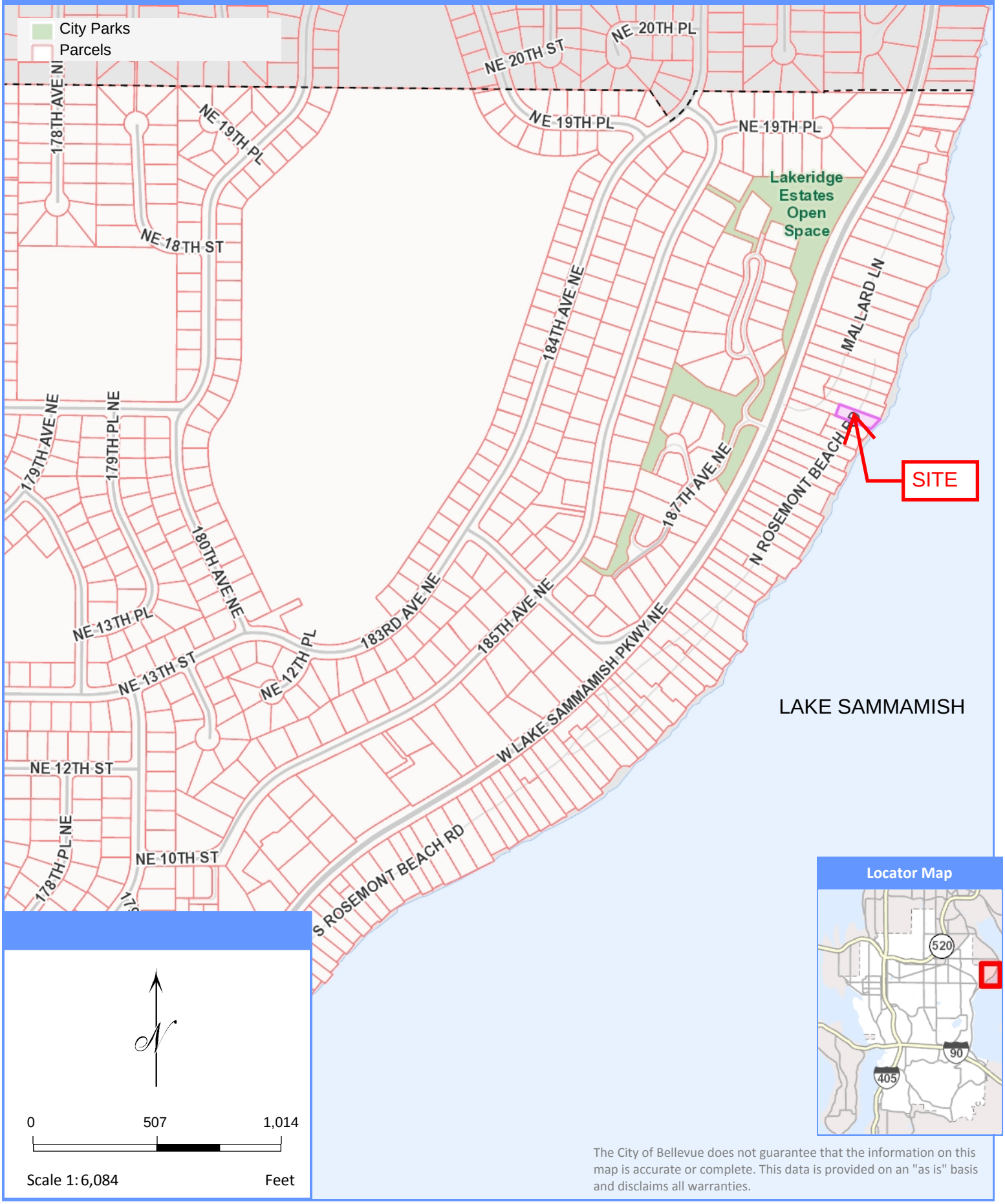
VICINITY MAP

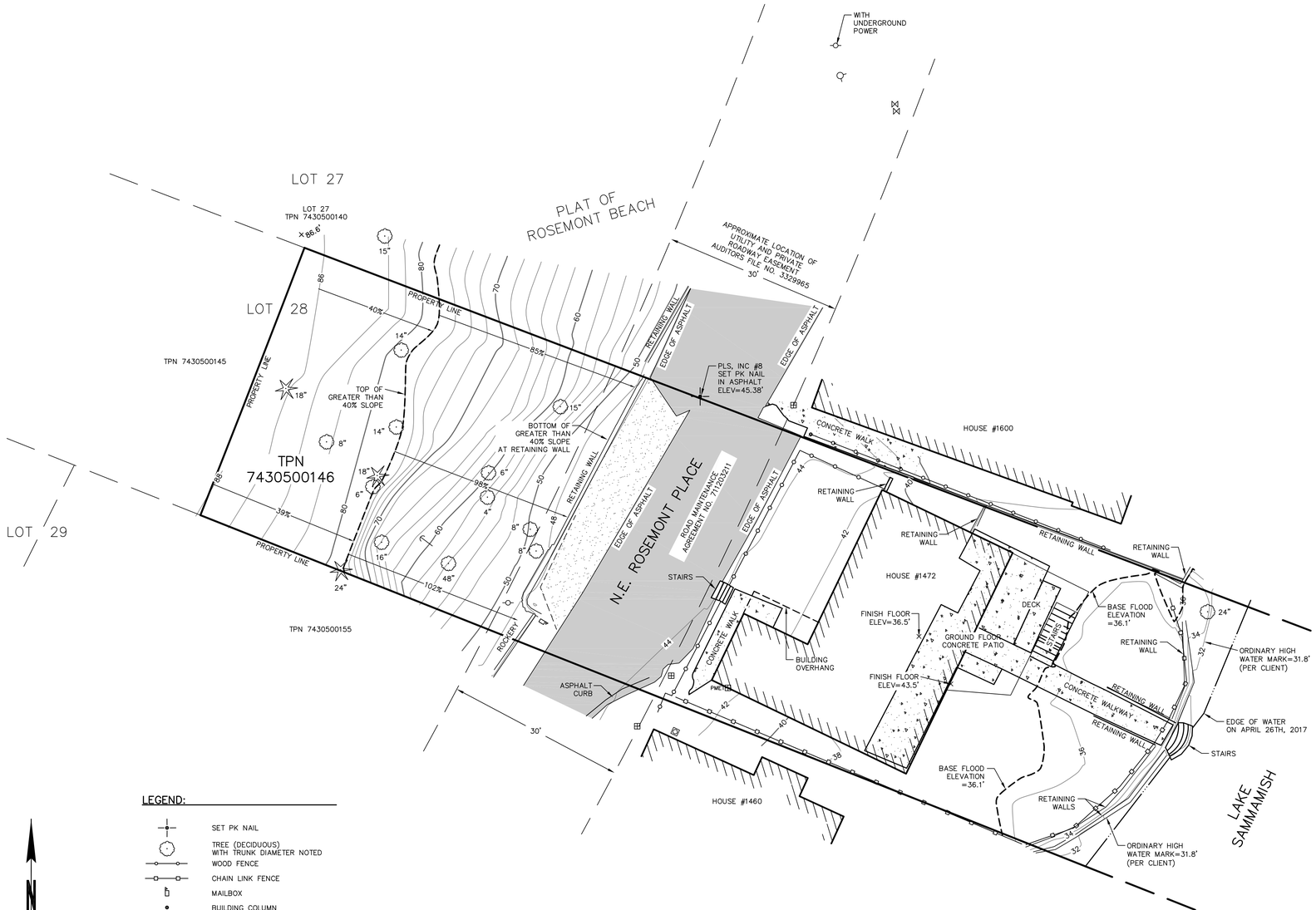


The City of Bellevue does not guarantee that the information on this map is accurate or complete. This data is provided on an "as is" basis and disclaims all warranties.

Map Generated on: 11/19/2019

TOPOGRAPHIC SURVEY

SW 1/4 NE 1/4 SEC. 30
TOWNSHIP 25 NORTH, RANGE 6 EAST W.M.
KING COUNTY, WASHINGTON



LEGEND:

- SET PK NAIL
- TREE (DECIDUOUS) WITH TRUNK DIAMETER NOTED
- WOOD FENCE
- CHAIN LINK FENCE
- MAILBOX
- BUILDING COLUMN
- PME — POWER METER
- UTILITY POLE
- GUY ANCHOR
- GAS METER
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- CONCRETE SURFACE
- GRAVEL SURFACE
- ×00.0' — SPOT ELEVATION

N

0 5 10 20

SCALE: 1"=10'
CONTOUR INTERVAL: 2 FOOT

LEGAL DESCRIPTION:
(PER REAL ESTATE EXCISE TAX AFFIDAVIT NO. E1457206)

LOT 28, ROSEMONT BEACH, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 34 OF PLATS, PAGE 28, IN KING COUNTY, WASHINGTON;

EXCEPT THE WEST 200 FEET THEREOF.

NOTES AND COMMENTS:

1.) PURPOSE OF SURVEY: THE PURPOSE OF THIS SURVEY WAS TO DEVELOP A 2-FOOT CONTOUR INTERVAL TOPOGRAPHIC MAP OF THE SUBJECT PROPERTY FOR USE AS A PLANNING AND DESIGN BASE BY OTHERS.

2.) HORIZONTAL DATUM: THE OVERALL HORIZONTAL DATUM FOR THIS PROJECT IS NAD 83/2011, WASHINGTON COORDINATE SYSTEM, NORTH ZONE, BASED ON CITY OF BELLEVUE MONUMENTS 513 AND 514.

3.) VERTICAL DATUM: THE VERTICAL DATUM FOR THIS SURVEY IS NAVD 88, BASED ON CITY OF BELLEVUE BENCHMARK NO. 493, WITH A PUBLISHED ELEVATION OF 150.70'.

4.) FIELD SURVEY METHODOLOGY: FIELD MEASUREMENTS FOR THIS SURVEY WERE PERFORMED USING A 5-SECOND OR BETTER ELECTRONIC TOTAL STATION.

5.) INSTRUMENT CALIBRATION: ALL MEASURING INSTRUMENTS EMPLOYED IN THIS SURVEY HAVE BEEN MAINTAINED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

6.) THIS MAP GRAPHICALLY REPRESENTS CONDITIONS AND FEATURES EXISTING AT THE TIME OF THIS SURVEY ONLY, WHICH WAS PERFORMED DURING APRIL OF 2017.

7.) THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT NAMED HEREON. ITS' USE DOES NOT EXTEND TO ANY UNNAMED PERSON OR PERSONS WITHOUT THE EXPRESS RECERTIFICATION BY THIS SURVEYOR NAMING SUCH PARTY.

8.) FOR YOUR INFORMATION: 0.0833 FEET = 1 INCH ON THE GROUND

9.) KING COUNTY TAX PARCEL NUMBER: 7430500146

10.) THE PROPERTY AND PUBLIC RIGHT-OF-WAY LINES SHOWN HEREON WERE CALCULATED USING A COMBINATION OF A) FOUND CITY OF BELLEVUE MONUMENT NUMBERS 513 AND 514; B) THE KING COUNTY ASSESSOR MAP; C) RECORDED PLAT MAPS; AND D) RECORDS OF SURVEYS. THEY ARE NOT THE RESULT OF AN OFFICIAL BOUNDARY DETERMINATION BY PLS, INC. AND SHOULD NOT BE RELIED UPON FOR ANY USE OTHER THAN GENERAL REFERENCE.

11.) WE HAVE USED GRAPHIC SYMBOLS TO REPRESENT SOME FEATURES ON THIS MAP, SUCH AS UTILITIES, TREES AND FENCES. THE DEFAULT SIZE OF THOSE SYMBOLS MAY NOT REFLECT THE TRUE SIZE OF THE FEATURE THAT WAS MAPPED.

PLS, Inc.
Professional Land Surveyors
1595 NW Gilman Boulevard, #15
Issaquah, Washington 98027
(425) 313-9378 (fax) 313-9379

QUN LI
12701 NE 39TH STREET
BELLEVUE, WA 98005

KURT A. PARCHER — STATE OF WASHINGTON — 22288 — REGISTERED LAND SURVEYOR — PROFESSIONAL

REVISIONS

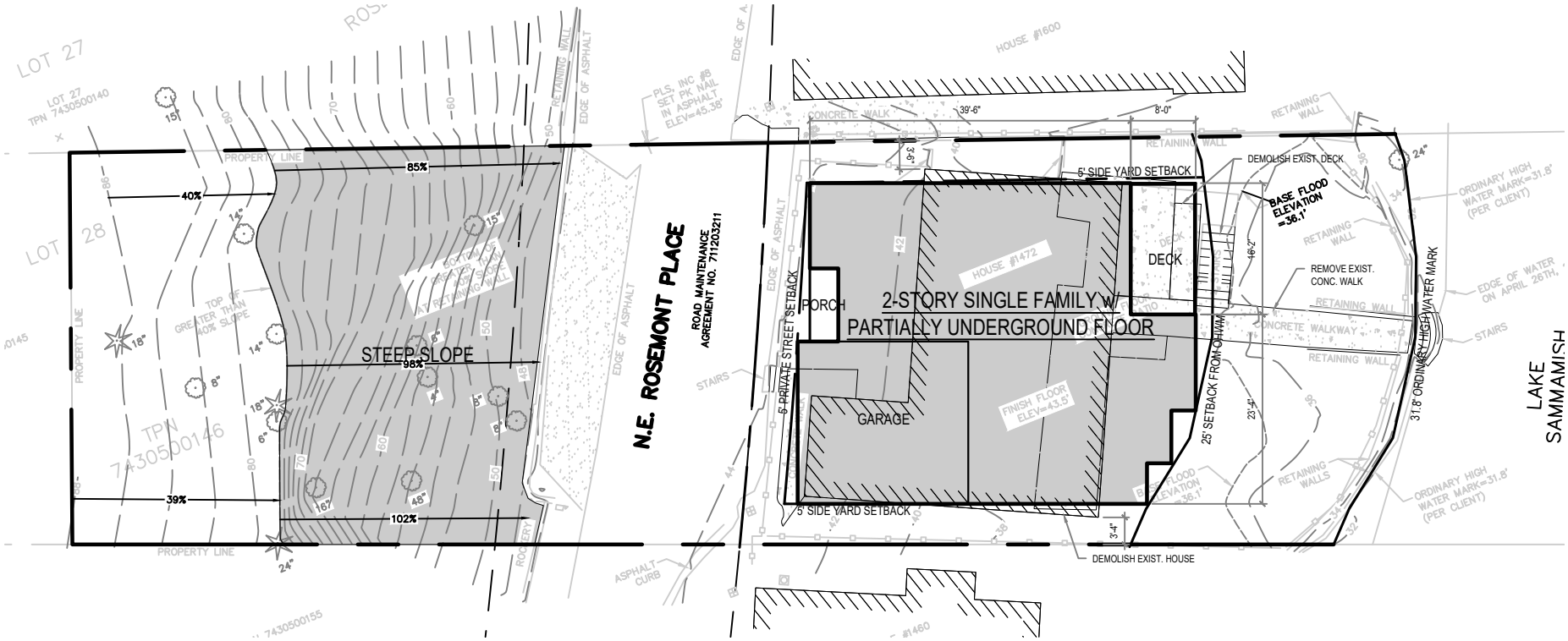
NO.	DATE	DESCRIPTION	BY
1	4/30/18	ADDED BASE FLOOD ELEVATION AND ORDINARY HIGH WATER MARK AND ADDN'L TOPOGRAPHIC MAPPING ON WESTERN PORTION OF LOT	BPM
2	5/4/18	ADDED EASEMENT NO. 3329965	KP
3	8/29/18	ADDED SLOPE DATA TO WESTERLY PROPERTY	BPM
4	9/14/18	UPDATED TOPOGRAPHIC FEATURES ON EASTERLY PORTION OF SITE, ADDED 40% SLOPE NOTES	BPM
5	10/15/18	UPDATED SURFACE ON EASTERLY PORTION OF SITE	BPM

SHEET TITLE: TOPOGRAPHIC SURVEY

CLIENT: QUN LI

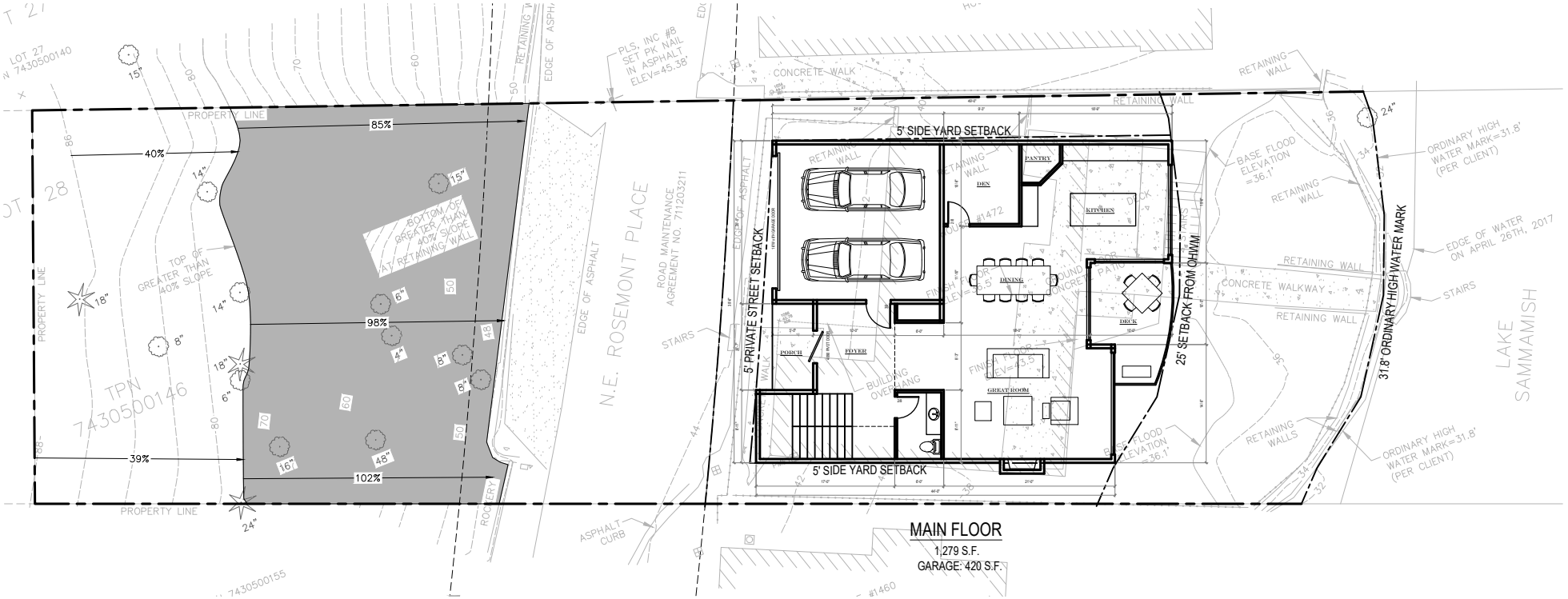
DRAWN BY: BPM
CHECKED BY: KAP
SCALE: 1"= 10'
DATE: MAY 12, 2017
JOB NO: 17067
DRAWING NAME: 17067 TOPO.DWG

SHEET 1 OF 1



SITE PLAN

SCALE: 1" = 20'=0"



MAIN FLOOR

1,279 S.F.
GARAGE: 420 S.F.

Document Title: Variance Application (Project Description and Code Compliance Narrative)

Grantor: Qun Li and Zhaoping Zheng
Grantee: City of Bellevue

Legal Description: Lot 28 of Rosemont Beach, as per plat recorded in volume 34 of plats, page 28, records of King County Auditor, recorded April, 19, 2017, under Recording Number 201704149001125, King County Auditor, situate in the County of King, State of Washington.

Assessor's Tax Parcel No: 743050-0146

Variance

Qun Li and Zhaoping Zheng, husband and wife ("Grantor") hereby record the report from City of Bellevue attached to this document to comply with the requirements of City of Bellevue for a variance with respect to the property described above.

Dated: _____, 2019

Qun Li

_____
Zhaoping Zheng

Contents

Attachments

1. Proposal Description

The applicant is proposing redevelopment of the property located at 1472 West Lake Sammamish Parkway North East with a new single-family home. The site is currently developed with one single family residence with a large desk and an existing dock. The project includes demolition of the existing residence and deck, re-grading of a portion of the site to allow the placement of the new home, and installation of site landscaping as mitigation for current proposed action and past actions taken out of permit scope. Redevelopment of the site requires deviation from the prescriptive requirements that apply to the site. The following is a list of actions for approval with this permit:

Actions for approval in compliance with prescriptive Land Use Code allowances:

- Reduction of the site's side yard setbacks to 5 feet for both sides as allowed under LUC 20.25H.040.B. Compliance with the minimum setback of 5 feet is required. No building elements may protrude into the reduced setback.

- Reduction of the toe of slope structure from 75 feet to a variable dimension necessary to accommodate the footprint of the new home as depicted in the project site plan (attached). This is under the existing structure.

- Reduction of the front yard setback from the North Rosemont Beach Drive access easement from 10 feet to 5 feet. Compliance with the minimum setback of 5 feet is required. No building elements may protrude into the reduced setback.

2. Site Description, Zoning, Land Use and Critical Areas

A. Site Description

The subject site is located at 1472 West Lake Sammamish Parkway NE. The property slopes down to each with significant grade change from the uphill portion near West Lake Sammamish Parkway NE. A portion of the site is sleep slope. At the toe (bottom) of steep slope areas, the site takes a private access from West Lake Sammamish Parkway via North Rosemont Beach Drive, a private access road of varying widths that services dozens of homes along the shoreline of Lake Sammamish. North Rosemont Beach Drive originates at the grade level of West Lake Sammamish Parkway dropping in elevation to lake level where the subject property is situated. The property is the fifth lots from the terminus of this access driveway.

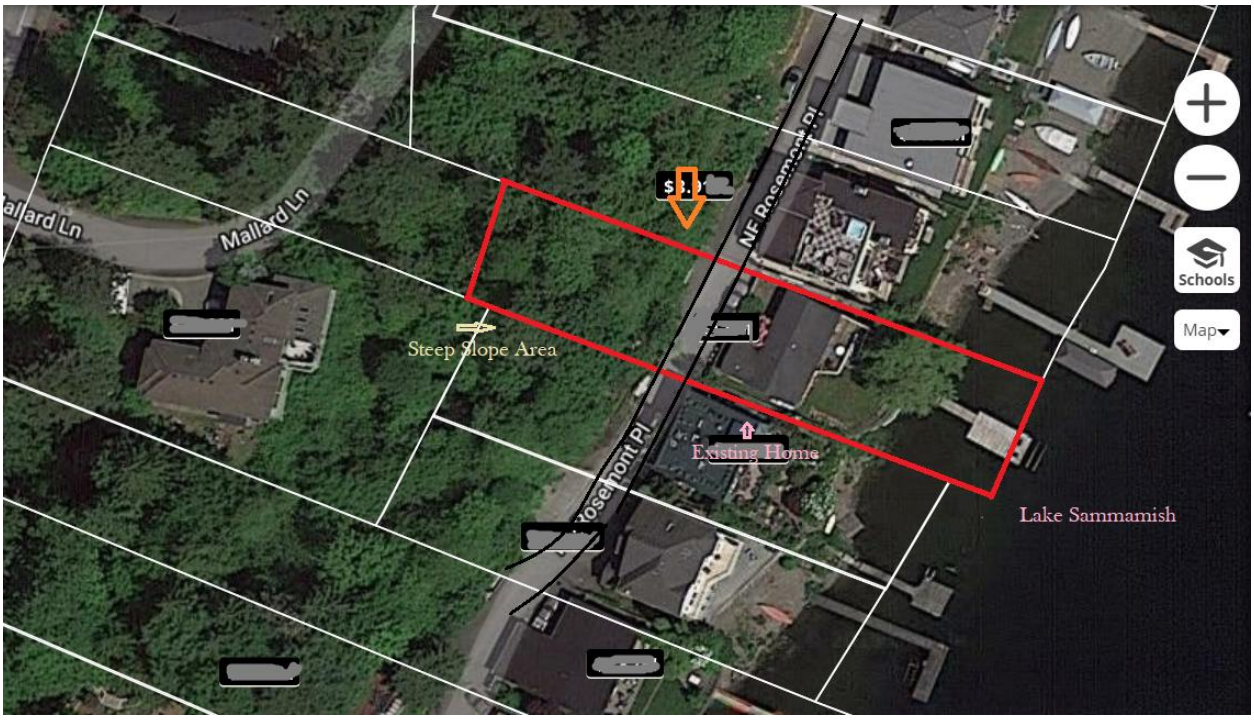
1472 West Lake Sammamish Parkway is characterized by a large geologic hazard steep slope critical area. The slope area is located between the front of the lot in the vicinity of Lake Sammamish Parkway NE, and the site's access driveway, North Rosemont Beach Drive. The slope area is forested although it has been historically cleared. The top of the slope is developed with a private access driveway (Mallard Lane) that services homes to the north of the site. The toe of the slope has been historically cut and the area along the shoreline graded to establish North Rosemont Beach Drive and provide building pads along this section of driveway. The site does not contain any structures with the protected slope or top of the slope buffer area. Development activity proposed with this application is limited to construction

at the toe and includes a widening of the paved area of North Rosemont Beach Drive (up to the toe of the slope), demolition of existing and construction of a new home, and maintaining existing site's backyard landscaping.

No impacts are proposed with the regulated slope area of top of slope buffer and no impacts or modifications are proposed to the toe of the slope. All impacts will occur with the 75 foot toe of slope structure setback required under LUC 20.25H.120.C. In response to restrictions on development in this area, the applicant has consulted with a qualified geoengineering firm and ha provided a geotechnical report as part of the application package supporting the proposal. The report recommends a reduction to the toe slope structure setback from 75 feet to setback matching the edge of the existing access easement driveway. The applicant has designed the new home in compliance with this recommended setback. See project geotechnical report included as Attachment 2.

The property owner is proposing redevelopment of the property and is requesting approval to build a new larger single-family home in the place of the current home between the access driveway, and the shoreline of Lake Sammamish. See Figure 1 below:

Figure 1 – 1472 West Lake Sammamish Parkway NE



Design Constraints: Several constraints were encountered in design of the proposed residence that prompted the applications for Critical Areas Land Use Permit and Variance from the Land Use Code. Constraints were as follows:

- Steep slopes along the western end of the site
- Shoreline frontage along the eastern edge of the site
- Narrow lot
- Access easement/driveway through the center of the site

These restrictions have limited site planning options in redevelopment of the property. As a result, the applicant has designed a home to occupy a specific area. The proposed site design represents a balancing of development restrictions with current site conditions and context and includes the following:

- The footprint of the home is proposed to be outside of the Lake Sammamish Floodplain – defined as elevation 36.1' NAVD (area of special flood hazard aka FEMA 100-year floodplain line). No building elements may extend into this required FEMA flood line.

- The footprint of the home is proposed to be constructed with a previously impacted portion of the 50-foot shoreline buffer and structure setback (allowed through Critical Area Land Use Permit).

- The footprint of the home is proposed to be constructed within the 75-foot toe of slope structure setback (allowed through Critical Areas Land Use Permit).

- The footprint of the home will retain 5-foot setbacks along both of the site's side yards (allowed by LUC 20.25H.040.B). That is changing from existing structure which has less than 4-foot setbacks on both side yards (3.4' and 3.6'). Compliance with the minimum setback of 5 feet is required. No building elements may protrude into the reduced setback.

- The footprint of the home will maintain a minimum of 5 feet of setback from the North Rosemont Beach Drive access easement (allowed through Variance from the Land Use Code). Compliance with the minimum setback of 5 feet is required. No building elements may protrude into the reduced setback.

3. Consistency with Land Use Code Requirements:

    a. Zoning District Dimensional Requirements
    The site is in the R-2.5 zoning district. The following table summarizes the dimensional standards that apply compared with the dimensions proposed under the requested variance:

Table 1: Dimensional Standards and Proposed Dimensions

STANDARD (* = variance requested) See discussion below for details	REQUIRED	PROPOSED
Front yard structure setback	20 feet	20 feet
*Setback from an Access Easement	10 feet	5 feet
Rear yard structure setback	25 feet	25 feet
Side yard structure setback	5 feet	5 feet
*2 side yards structure setback	15 feet	10 feet
* Shoreline structure setback	25 feet	Variable 24' to 28'
Maximum building height	35 feet	35 feet
Maximum lot coverage	35%	< 35%
Maximum impervious surface	50%	< 50 %

b. Comparison of Neighborhood Development

Table 2: Front Yard setback Comparison of Neighborhood Development

West Lake Sammamish Parkway address	Setback From Easement	Building Envelope
1614 (built in 1998)	12 feet	Appr. 1,800 sq ft.
1610 (built in 1950)	15 feet	Appr. 1,600 sq ft.
1604 (built in 2017)	5 feet	Appr. 1,800 sq ft.
1600 (built in 2018)	5 feet	Appr. 1,800 sq ft
1462 (built in 1945)	2 feet	Appr. 1,300 sq ft.
1460 (built in 2000)	20 feet (no garage/carport)	Appr. 1,333 sq ft.
1454 (built in 1967)	5 feet	Appr. 1,400 sq ft.
1450 (built in 1966)	13 feet	Appr. 1,800 sq ft.

c. Front yard/Access Easement structure setback of 5 feet

Due to the relative shallow depth of the developable portion of the property, coupled with the required 25-foot shoreline critical area shoreline buffer, the only feasible location to site the proposed structure is between the shared access road (North Rosemont Beach Drive) and Lake Sammamish, requiring a reduction from the standard 10-foot structure setback measured from shared access driveways. The critical areas overlay section of the Land Use Code (LUC 20.25H) encourages this sort of adjustment in order to protect the functions and values of the shoreline critical area.

Most of the homes in this section of North Rosemont Beach Drive were constructed prior to annexation into the City of Bellevue with existing are setback ranging from 5 to 10 feet measured from the edge of the private access easement. Due to the shallow depth of the buildable portion of this lot and the context of the surrounding neighborhood, a 5-foot setback for the Li property is appropriate.

As demonstrated in Table 2 above, the requested variance would not be a granting of special privilege. Several the properties in the vicinity already enjoy a reduced front yard setback due to the constraint of the lakeshore, the access easement and uphill slopes. Not granting the requested variance would render an undesirable building footprint compared to the surrounding properties and would constitute a significant hardship to the property owner as the standard buildable area allowed without variance would result in an un-marketable home.

Two neighbors, 1604 and 1600 (1600 is next door) had applied the similar variance in last 3-4 years and got approval. We are asking City to give us the approval as well. Also, the site is located at the end of and adjacent to a private shared access driveway. No impact to the access easement is expected.

4. Critical Areas Requirements – LUC 20.25H
    a. General
        i. LUC 20.25H.230

        The applicant supplied a complete critical area report for shoreline functions evaluation and floodplain functions evaluation, and geotechnical report (geo engineering study). The report meets the minimum requirements in LUC 20.25H.250.

b. Geologic Hazards

i. LUC 20.25H.115 Shoreline Buffer and Structure Setback Requirements

The applicant is not proposing any development or construction with the critical area or critical area buffer. The applicant's geotechnical engineer has evaluated the slope and the proposed construction and recommends that the structure can safely be located with the toe of steep slope without risk (see Project Geotech Report – Attachment 2). No modification to the slope, toe of slope, or top of slope buffer is proposed or allowed as part of this permit.

c. Shorelines

i. LUC 20.25H.115 Shoreline Buffer and structure Setback Requirements

The applicant has provided information necessary to reduce the shoreline buffer and structure setback from the required 50-foot standard dimension for developed sites to Areas permit process. No reduction of the required 25-foot buffer is proposed. No building elements may protrude into the required shoreline buffer.

ii. LUC 20.25E.080.Q Performance Standards for Residential Development

The residential development regulations of the shoreline overlay district are being met. The home as proposed is under the 35-foot maximum height as measured from average existing grade. The proposal includes a professional aquatic biologist's report (Attachment 3).

The new structure will be located outside of the 25-foot Lake Sammamish buffer, and landward of an existing, legally established retaining wall. All proposed work will be approximately 5-feet and higher above the ordinary high-water mark (OHWM) of 31.8 feet elevation used by the City of Bellevue as a regulatory line from which to measure buffers for Lake Sammamish.

No work is proposed within the Lake Sammamish floodplain (elevation 36.1 feet). Both the existing and proposed homes are located entirely within the Shoreline Management Area (SMA). There is no developable land on the lot that is not within the SMA. No native vegetation will be disturbed. No existing trees or native shoreline vegetation will be disturbed. The house will not disturb a steep slope located on the property but will be partially located within the 75-foot structure setback from the toe of the slope, and no other critical areas or habitat will be affected by the proposed action.

Because no new adverse impacts are proposed to critical areas, there is no net change in impacted area within the shoreline or steep slope buffer, and there will be a reduction of 40 sq.ft. of impervious surface within the Shoreline Structure Setback area, no additional mitigation is proposed.

Earth Solutions NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
PROPOSED SINGLE-FAMILY RESIDENCE RECONSTRUCTION
1472 WEST LAKE SAMMAMISH PARKWAY NORTHEAST
BELLEVUE, WASHINGTON

ES-6876

15365 N.E. 90th Street, Suite 100 Redmond, WA 98052
(425) 449-4704 Fax (425) 449-4711
www.earthsolutionsnw.com

PREPARED FOR

MR. QUN LI

October 16, 2019

Keven D. Hoffmann, P.E.
Senior Project Manager

Kyle R. Campbell, P.E.
Principal Engineer

GEOTECHNICAL ENGINEERING STUDY
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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Earth Solutions NW LLC

Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

October 16, 2019
ES-6876

Mr. Qun Li
1472 West Lake Sammamish Parkway Northeast
Bellevue, Washington 98008

Greetings, Mr. Li:

Earth Solutions NW, LLC (ESNW) is pleased to present this report of our geotechnical consulting services. In our opinion, the proposed residential reconstruction is feasible from a geotechnical standpoint. Our study indicates the site is primarily underlain by alluvial deposits (silty sand and sandy silt). During our September 2019 field exploration, groundwater seepage was encountered at a depth of about nine feet below existing grades. In our opinion, the contractor should be prepared to respond to groundwater seepage zones during constriction.

The proposed residential structure may be supported on conventional continuous and spread footing foundations bearing on competent native soil, recompacted native soil, or new structural fill. Where encountered, fill intended for reuse as structural fill must be primarily free of organic and deleterious material and should be evaluated by ESNW at the time of construction. In general, we expect competent native soil suitable for support of the foundation will likely be encountered within two feet of existing grades at the shoreline subgrade elevation. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soil to the specifications of structural fill or overexcavation and replacement with suitable structural fill will likely be necessary.

Pertinent geotechnical recommendations are provided in this study. We appreciate the opportunity to be of service to you on this project. Please call if you have any questions about this study or if you need additional information.

Sincerely,

EARTH SOLUTIONS NW, LLC

Keven D. Hoffmann, P.E.
Senior Project Manager

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ES-6876

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Cont'd

ES-6876

GEOTECHNICAL ENGINEERING STUDY
PROPOSED SINGLE-FAMILY RESIDENCE RECONSTRUCTION
1472 WEST LAKE SAMMAMISH PARKWAY NORTHEAST
BELLEVUE, WASHINGTON

ES-6876

INTRODUCTION

General

This geotechnical engineering study (study) was prepared for the proposed single-family residential reconstruction to be completed at 1472 West Lake Sammamish Parkway Northeast, in Bellevue, Washington. The purpose of this study was to provide geotechnical recommendations for currently proposed development plans. In accordance with our proposal, the following services were completed to prepare this study:

- Borings to characterize soil and groundwater conditions;
- Laboratory testing of soil samples collected at the boring locations, and;
- Engineering analyses.

The following documents and maps were reviewed as part of our study preparation:

- Client-provided Site Plan, undated;
- Online Web Soil Survey (WSS) resource, maintained by the Natural Resources Conservation Service under the United States Department of Agriculture (USDA);
- Part 20.25H of the City of Bellevue Land Use Code (LUC);
- City of Bellevue (City) Critical Hazard Maps: Online "Geologic Hazards" Map;
- Liquefaction Susceptibility Map 11-5, prepared by the King County Flood Control District, dated May 2010, and;
- Geologic Map of the East Half of the Bellevue South 7.5' x 15' Quadrangle, Issaquah Area, King County, Washington, by Derek B. Booth et al., 2012.

Project Description

We understand the existing single-family residence will be removed, and a new single-family residence will be constructed at the approximate location of the existing footprint. At the time of report submission, specific grading and building loading plans were not available for review; however, based on our experience with similar projects, the proposed residential structure will likely be constructed using relatively lightly loaded wood framing supported on a conventional foundation system and daylight-basement foundation walls. Perimeter footing loads will likely be 1 to 2 kips per lineal foot (klf). Slab-on-grade loading is anticipated to be about 150 pounds per square foot (psf).

Based on the existing topography and the configurations of both the existing and proposed residences, we anticipate grading activities will include daylight-basement excavations and related foundation wall construction. Temporary slope excavations and areas of shoring will likely be necessary to complete the building pad preparation. Where possible, the existing concrete foundation walls may be preserved and temporarily supported to assist with excavation support.

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations provided in this report. ESNW should review the final designs to confirm that our geotechnical recommendations have been incorporated into the plans.

SITE CONDITIONS

Surface

The site is located along Lake Sammamish and east of Northeast Rosemont Place (a private road), roughly one-third mile northeast of the intersection with West Lake Sammamish Parkway Northeast, in Bellevue, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map). The property is comprised of one tax parcel (King County Parcel No. 743050-0146), totaling about 8,230 square feet. The subject site is bordered to the northeast and southwest by single-family residences, to the west by Mallard Lane (a private road), and to the east by Lake Sammamish.

The existing topography descends roughly 10 to 15 feet from Northeast Rosemont Place to the shoreline. According to the referenced site plan, the slope west of Northeast Rosemont Place—referred to as the "slope" herein—is inclined at about 85 to 102 percent from roughly the west-central slope area to the retaining wall along Northeast Rosemont Place. Between the western property line and roughly the west-central site area, grades are less than 40 percent. The slope is vegetated with dense, mature forest growth.

Subsurface

An ESNW representative observed, logged, and sampled two borings on September 6, 2019. The borings were advanced using a limited-access drill rig and operators retained by our firm. The borings were completed to evaluate soil and groundwater conditions as near as possible to the proposed reconstruction area. The approximate locations of the borings are depicted on Plate 2 (Boring Location Plan). Please refer to the boring logs provided in Appendix A for a more detailed description of subsurface conditions. Representative soil samples collected at the boring locations were analyzed in general accordance with both Unified Soil Classification System (USCS) and USDA methods and procedures.

Native Soil

Underlying about 8 to 10 inches of asphalt and crushed rock fill, the native soil was comprised of silty sand and sandy silt (USCS: SM and ML, respectively). The native soil density was very loose until a depth of about five feet below the existing ground surface (bgs), becoming medium dense until about seven feet bgs, and thereafter remaining dense to the termini of the boreholes. The native soil was reported primarily as "wet" at the time of the exploration, and the maximum exploration depth was about 16.5 feet bgs.

Geologic Setting

The referenced geologic map resource identifies alluvium (Qal) across the proposed development area. As described on the geologic map resource, alluvium typically consists of moderately sorted cobble gravel, pebbly sand, and sandy silt, which was deposited along major stream channels. Pre-Fraser fine-grained deposits are mapped on the slope and are typically comprised of unoxidized to slightly oxidized silt and clay.

The referenced WSS resource identifies very steep Alderwood and Kitsap soils (AkF) across the site and surrounding areas. Alderwood and Kitsap series soils were formed in moraines and glacial till plains.

Based on our field observations, the native soil encountered during our fieldwork generally correlates with the geologic setting outlined in this section.

Groundwater

During our subsurface exploration completed on September 6, 2019, groundwater seepage was encountered at a depth of approximately nine feet bgs. In our opinion, groundwater should be expected within site excavations depending on the extent of grading activities. Seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the winter, spring, and early summer months.

Geologic Hazard Areas Review

The referenced online City map and LUC 20.25H were reviewed to determine the presence of geologic hazard areas on site. Based on our review of the LUC, the site contains a seismic hazard area and steep slopes. The referenced online City map depicts the site within a very severe soil erosion hazard area as well.

Based on our field observations and review, it is our opinion that the slope is correctly classified as a steep slope and within a very severe erosion hazard area. Given the relatively dense state of the native soil at depth as well as the primarily fine-grained nature of the native soil, it is our opinion the site is not located within a seismic hazard area, and the potential for liquefaction during a seismic event is low.

Analysis of Proposal

Based on our field observations and understanding of the project, it is our opinion the proposal is feasible from a geotechnical standpoint. Given the existing level of development both on site and adjacent to the site, and because the project intends to reconstruct a new single-family residence in the immediate vicinity of the existing residence, it is our opinion the proposal will not increase the potential for soil movement, and the risk of damage to the proposed development or adjacent properties from soil movement will be minimal. The Lake Sammamish shoreline has been successfully developed with single-family residences over many decades, and as such, it is our opinion that setbacks and buffers from geologic hazard areas are not applicable to the proposal.

DISCUSSION AND RECOMMENDATIONS

General

In our opinion, construction of the proposed residential structure is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with proposed development activities include temporary excavations and related support, foundation support, slab-on-grade subgrade support, and the suitability of using on-site soil as structural fill. As outlined in the *Project Description* section of this report, excavations to achieve the design subgrade elevations will likely require temporary slope construction and/or areas of shoring to establish daylight-basement elevations.

The proposed residential structure may be supported on conventional continuous and spread footing foundations bearing on competent native soil, recompacted native soil, or new structural fill. Where encountered, fill intended for reuse as structural fill must be primarily free of organic and deleterious material and should be evaluated by ESNW at the time of construction. In general, we expect competent native soil suitable for support of the foundation will likely be encountered within two feet of existing grades at the shoreline subgrade elevation. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soil to the specifications of structural fill or overexcavation and replacement with suitable structural fill will likely be necessary.

This study has been prepared for the exclusive use of Mr. Qun Li and his representatives. A warranty is neither expressed nor implied. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Initial site preparation activities will consist of installing temporary erosion control measures, establishing grading limits, and clearing existing structural improvements.

Temporary Erosion Control

The following temporary erosion control measures are offered:

- Ongoing measures to prevent construction vehicle track-out, such as a properly maintained temporary construction entrance or a tire wash, should be installing prior to beginning earthwork activities. Street sweeping may be necessary if sediment is tracked off site.
- Silt fencing should be placed around the site perimeter.
- When not in use, soil stockpiles should be covered or otherwise protected.
- Temporary measures for controlling surface water runoff, such as interceptor trenches, sumps, or interceptor swales, should be installed prior to beginning earthwork activities.
- Dry soil disturbed during construction should be wetted to minimize dust and airborne soil erosion.
- When appropriate, permanent planting or hydroseeding will help to stabilize the soil.

Additional Best Management Practices (BMPs), as specified by the project civil engineer and indicated on the plans, should be incorporated into construction activities. Temporary erosion control measures may be modified during construction as site conditions require and as approved by the site erosion control lead.

Excavations and Slopes

Based on the soil conditions observed at the boring locations, the allowable temporary slope inclinations provided in this section, as a function of horizontal to vertical (H:V) inclination, are recommended. The applicable Federal Occupation Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) soil classifications are also provided.

- Within roughly the upper five feet of existing grades, we expect loose to medium dense soil will be encountered, which is considered Type C soil by OSHA and WISHA. Temporary excavations within loose to medium dense soil should be inclined no steeper than 1.5H:1V. This recommendation also applies to any area where groundwater seepage is exposed.

- Below about five feet bgs, we expect medium dense to dense soil will be encountered, which is considered Type B soil by OSHA and WISHA. Temporary excavations within medium dense to dense soil should be inclined no steeper than 1H:1V.

Permanent slopes should be planted with vegetation to both enhance stability and minimize erosion and should maintain a gradient of 2H:1V or flatter. The presence of perched groundwater may cause localized sloughing of temporary slopes due to excess seepage forces. An ESNW representative should observe temporary and permanent slopes to confirm the slope inclinations are suitable for the exposed soil conditions and to provide additional excavation and slope recommendations as necessary. If the recommended temporary slope inclinations cannot be achieved, temporary shoring may be necessary to support excavations.

Existing basement foundation walls may be utilized for temporary excavation support where feasible. ESNW should be contacted to evaluate the integrity of existing basement foundation walls to support the temporary excavations at the time of construction.

In-situ and Imported Soil

The on-site soil is moisture sensitive, and successful use of the on-site soil as structural fill will largely be dictated by the moisture content at the time of placement and compaction. Remedial measures may be necessary as part of site grading and earthwork activities. If the on-site soil cannot be successfully compacted, the use of an imported soil may be necessary. In our opinion, a contingency should be provided in the project budget for the export of soil that cannot be successfully compacted as structural fill, particularly if grading activities take place during periods of extended rainfall activity. In general, soil with appreciable fines content (greater than 5 percent) typically degrades rapidly when exposed to periods of rainfall.

Imported soil intended for use as structural fill should be evaluated by ESNW during construction. The imported soil must be able to achieve the necessary moisture content, as determined by the Modified Proctor Method (ASTM D1557), at the time of placement and compaction. During wet weather conditions, imported soil intended for use as structural fill should consist of a well-graded, granular soil with a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction).

Subgrade Preparation

Following the removal of the existing structure, grade cuts will be necessary to establish the proposed subgrade elevations for the new structure. Temporary slope construction and/or areas of shoring will likely be necessary to establish daylight-basement elevations. ESNW should observe the subgrade during initial site preparation activities to confirm soil conditions and to provide supplemental recommendations for subgrade preparation. The process of removing the existing structure may produce voids where the old foundation is removed from and where crawl space areas may have been present. Complete restoration of voids from the old foundation area must be executed as part of overall subgrade and building pad preparation activities. The following guidelines should be incorporated into the final design:

- Where voids and related demolition disturbances extend below planned subgrade elevations, restoration of the void and/or unstable areas should be completed using structural fill.

- Recompact or overexcavate and replace areas of existing fill (if present) exposed at building subgrade elevations. Overexcavations should extend into competent native soil, and structural fill should be used to restore subgrade elevations.

- ESNW should confirm subgrade conditions and the required level of recompaction or overexcavation and replacement during site preparation activities, as well as the overall suitability of prepared subgrade areas following site preparation activities.

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, roadway, permanent slope, retaining wall, and utility trench backfill areas. Structural fill placed and compacted during site grading activities should meet the following specifications and guidelines:

- Structural fill material — Granular soils*
- Moisture content — At or slightly above optimum†
- Relative compaction (minimum) — 95 percent (Modified Proctor)
- Loose lift thickness (maximum) — 12 inches

* *The existing soil may not be suitable for use as structural fill unless the soil is at (or slightly above) the optimum moisture content at the time of placement and compaction.*

† *Soil shall not be placed dry of optimum and should be evaluated by ESNW during construction.*

With respect to underground utility installations and backfill, local jurisdictions may dictate the soil type(s) and compaction requirements. Areas of otherwise unsuitable material and debris should be removed from structural areas and replaced with structural fill.

Foundations

The proposed residential structure may be supported on conventional continuous and spread footing foundations bearing on competent native soil, recompacted native soil, or new structural fill. Where encountered, fill intended for reuse as structural fill must be primarily free of organic and deleterious material and should be evaluated by ESNW at the time of construction. In general, we expect competent native soil suitable for support of the foundation will likely be encountered within two feet of existing grades at the shoreline subgrade elevation. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soil to the specifications of structural fill or overexcavation and replacement with suitable structural fill will likely be necessary.

Provided the foundation will be supported as prescribed, the following parameters may be used for design:

- Allowable soil bearing capacity — 2,500 psf
- Passive earth pressure — 300 pcf (equivalent fluid)
- Coefficient of friction — 0.40

A one-third increase in the allowable soil bearing capacity may be assumed for short-term wind and seismic loading conditions. The above passive pressure and friction values include a factor-of-safety of 1.5. With structural loading as expected, total settlement in the range of one inch and differential settlement of about one-half inch is anticipated. Most of the settlements should occur during construction when dead loads are applied.

Seismic Design

The 2015 International Building Code recognizes the American Society of Civil Engineers (ASCE) for seismic site class definitions. In accordance with Table 20.3-1 of the ASCE Minimum Design Loads for Buildings and Other Structures manual, Site Class D should be used for design. Please refer to the *Geologic Hazard Areas Review* section of this report for an opinion of the site-specific seismic hazard.

Slab-on-Grade Floors

The slab-on-grade floor for the proposed residential structure should be supported on a competent, well-compacted, firm, and unyielding subgrade. Unstable or yielding subgrade areas should be recompacted or overexcavated and replaced with suitable structural fill prior to slab construction.

A capillary break consisting of at least four inches of free-draining crushed rock or gravel should be placed below the slab. The free-draining material should have a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction). In areas where slab moisture is undesirable, installation of a vapor barrier below the slab should be considered. If a vapor barrier is to be used, it should be a material specifically designed for use as a vapor barrier and should be installed in accordance with the recommendations of the manufacturer.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. The following parameters may be used for design:

• Active earth pressure (unrestrained condition)	35 pcf (equivalent fluid)
• At-rest earth pressure (restrained condition)	55 pcf
• Traffic surcharge* (passenger vehicles)	70 psf (rectangular distribution)
• Passive earth pressure	300 pcf (equivalent fluid)
• Coefficient of friction	0.40
• Seismic surcharge	6H psf†

* *Where applicable*
† *Where H equals the retained height (in feet)*

The above design parameters are based on a level backfill condition and level grade at the wall toe. Revised design values will be necessary if sloping grades are to be used above or below retaining walls. Additional surcharge loading from adjacent foundations, sloped backfill, or other relevant loads should be included in the retaining wall design.

Retaining walls should be backfilled with free-draining material that extends along the height of the wall and a distance of at least 18 inches behind the wall. The upper 12 inches of the wall backfill may consist of a less permeable soil if desired. A perforated drainpipe should be placed along the base of the wall and connected to an approved discharge location. A typical retaining wall drainage detail is provided on Plate 3. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Drainage

Groundwater seepage will likely be encountered within site excavations depending on the time of year grading operations take place. Temporary measures to control surface water runoff and groundwater during construction would likely involve interceptor trenches, interceptor swales, and sumps. ESNW should be consulted during preliminary grading to identify areas of seepage and provide recommendations to reduce the potential for seepage-related instability.

Finish grades must be designed to direct surface drain water away from structures and slopes. Water must not be allowed to pond adjacent to structures or slopes. In our opinion, a foundation drain should be installed along the building perimeter footing. A typical foundation drain detail is provided on Plate 4.

Given the proximity of the site to Lake Sammamish, the daylight basement slab-on-grade may require a sub-slab drainage system. ESNW should review final plans and observe conditions during construction to further evaluate the need for a sub-slab drain.

Utility Support and Trench Backfill

In our opinion, the on-site soil will generally be suitable for support of utilities. Remedial measures may be necessary in some areas to provide support for utilities, such as overexcavation and replacement with structural fill or placement of geotextile fabric. Groundwater seepage may be encountered within utility excavations, and caving of trench walls may occur where groundwater is encountered. Depending on the time of year and conditions encountered, dewatering or temporary trench shoring may be necessary during utility excavation and installation.

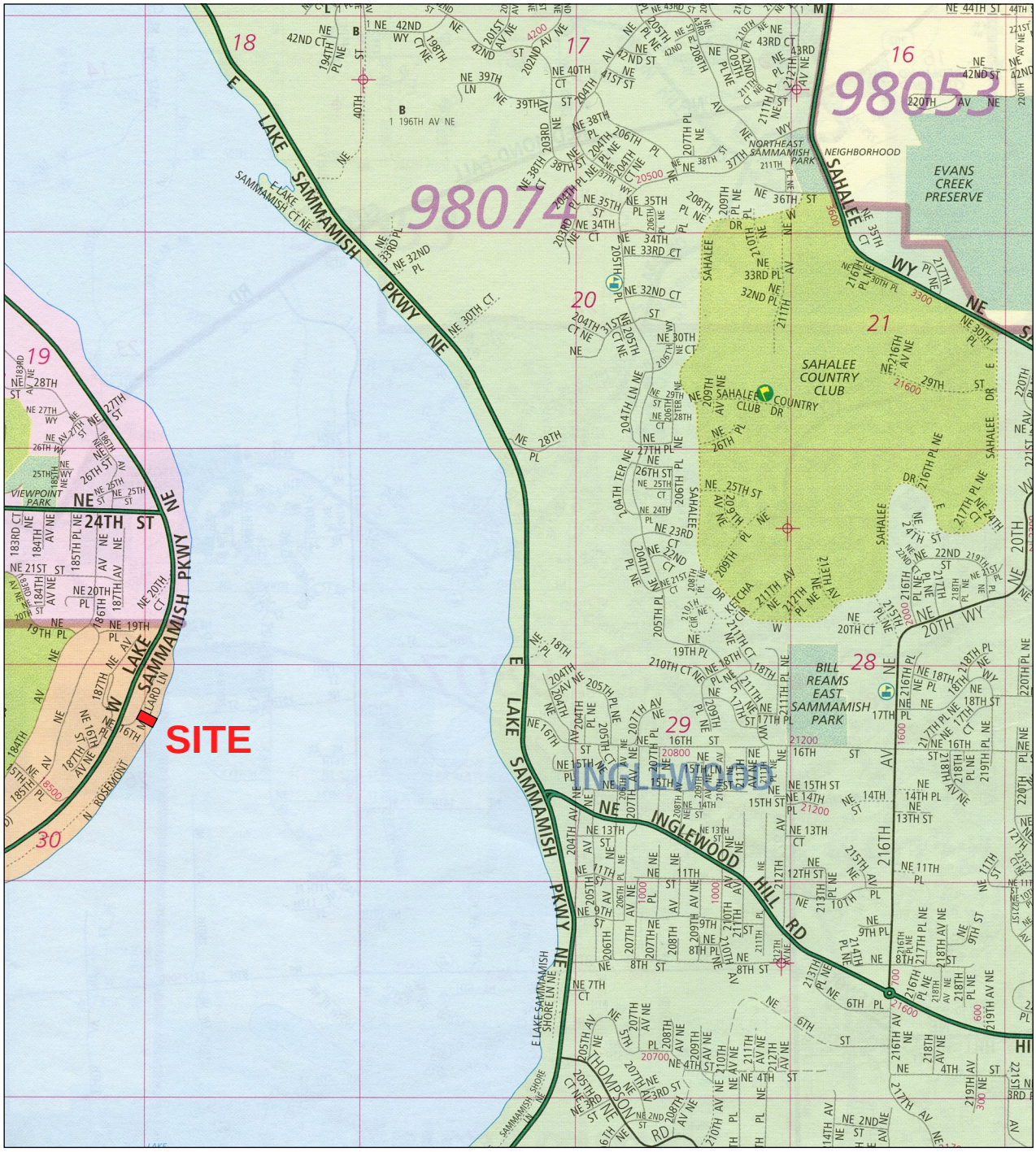
The on-site soil may be suitable for use as structural backfill throughout utility trench excavations provided the soil is at (or slightly above) the optimum moisture content at the time of placement and compaction. Moisture conditioning of the soil may be necessary at some locations prior to use as structural fill. Each section of the utility lines must be adequately supported in the bedding material. Utility trench backfill should be placed and compacted to the specifications of structural fill as previously detailed in this report or to the applicable specifications of the City or another responsible jurisdiction or agency.

LIMITATIONS

The recommendations and conclusions provided in this study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is neither expressed nor implied. Variations in the soil and groundwater conditions observed at the boring locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions provided in this study if variations are encountered.

Additional Services

ESNW should have an opportunity to review final project plans with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.



Reference:
King County, Washington
Map 567
By The Thomas Guide
Rand McNally
32nd Edition

NORTH

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Li Residence
Bellevue, Washington

Drwn.	MRS	Date	10/16/2019	Proj. No.	6876
Checked	KDH	Date	Oct. 2019	Plate	1

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NORTH

NOT - TO - SCALE

LEGEND

B-1 — Approximate Location of ESNW Boring, Proj. No. ES-6876, Sept. 2019

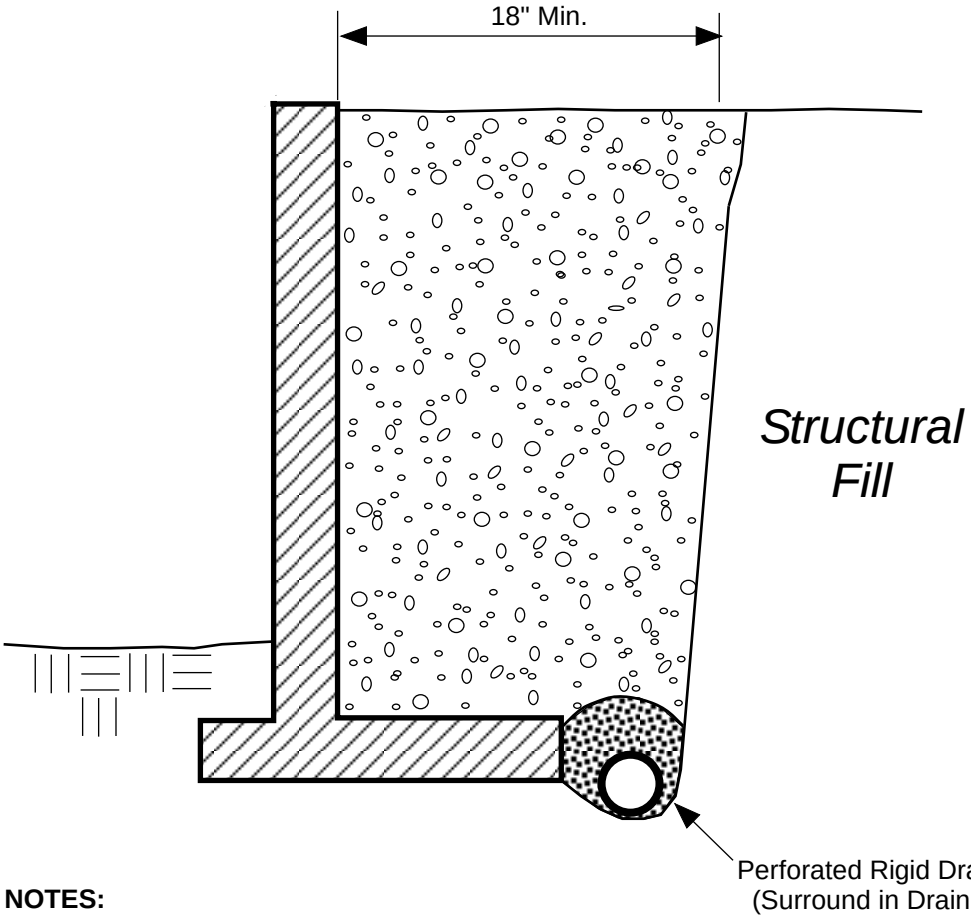
Subject Site

Existing Building

Boring Location Plan
Li Residence
Bellevue, Washington

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Drwn. By	MRS
Checked By	KDH
Date	10/16/2019
Proj. No.	6876
Plate	2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

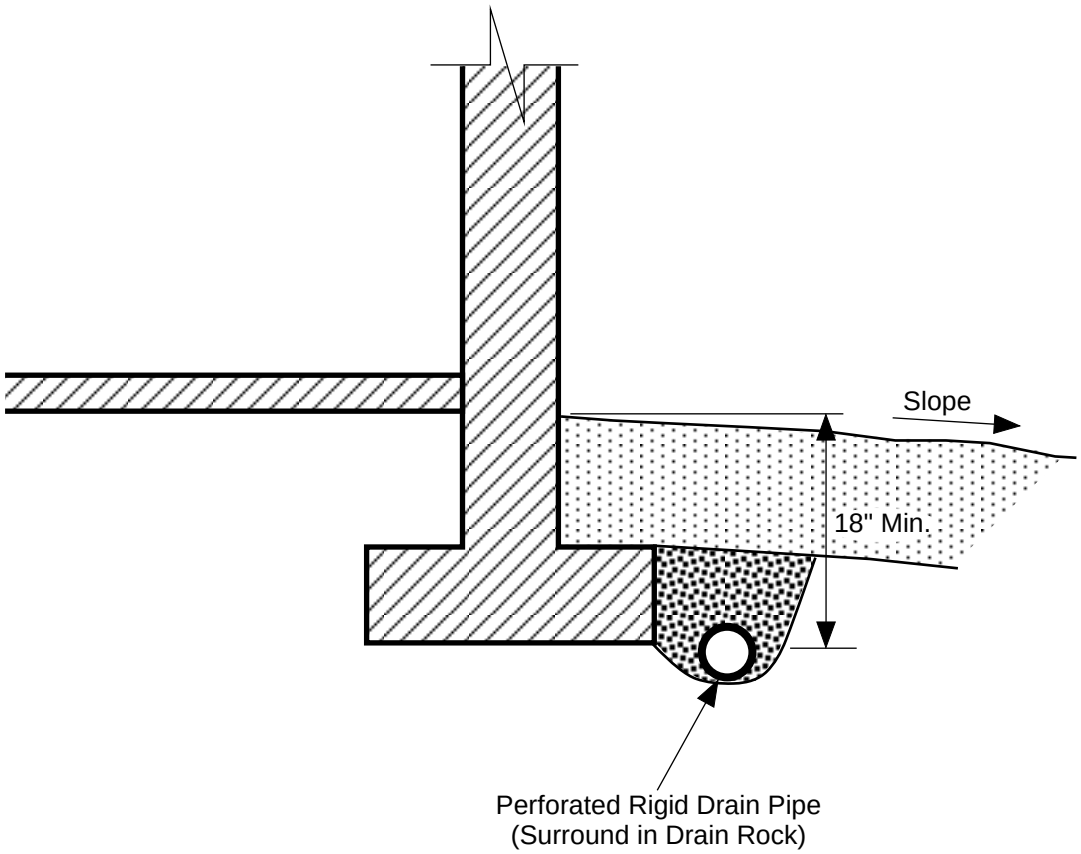
Free-draining Structural Backfill

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
Li Residence
Bellevue, Washington

Drwn. MRS	Date 10/16/2019	Proj. No. 6876
Checked KDH	Date Oct. 2019	Plate 3



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
Li Residence
Bellevue, Washington

Drwn. MRS	Date 10/16/2019	Proj. No. 6876
Checked KDH	Date Oct. 2019	Plate 4

Appendix A

Subsurface Exploration
Boring Logs

ES-6876

Subsurface conditions on site were explored on September 6, 2019, by advancing two borings using a limited-access drill rig and operators retained by our firm. The approximate locations of the borings are illustrated on Plate 2 of this study. The boring logs are provided in this Appendix. The borings were advanced to a maximum depth of about 16.5 feet bgs.

Corrected N-values were used within our boring logs and the preparation of this study to compensate for various testing factors encountered during the normal course of fieldwork. The following equation and coefficients were used to obtain the corrected N-values:

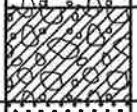
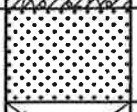
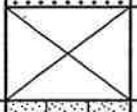
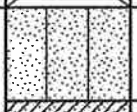
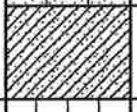
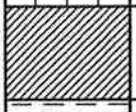
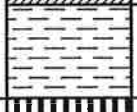
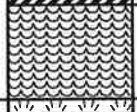
$$N_{60} = 1.67\ E_m\ C_b\ C_r\ N$$

where N_{60} = SPT N-value corrected for various field-testing factors;
E_m = 0.60 (hammer efficiency for a safety hammer);
C_b = 1.00 (borehole diameter correction for a 4-inch-diameter borehole);
C_r = 0.75 to 1.00 (rod length correction variation depending on borehole depth), and;
N = measured SPT N-value during fieldwork.

The final logs represent the interpretations of the field logs and the results of laboratory analyses. The stratification lines on the logs represent the approximate boundaries between soil types. In actuality, the transitions may be more gradual.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-1

PROJECT NUMBER ES-6876 **PROJECT NAME** Li Residence

DATE STARTED 9/6/19 **COMPLETED** 9/6/19 **GROUND ELEVATION** 44 ft **HOLE SIZE**

DRILLING CONTRACTOR Boretec1, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD HSA **AT TIME OF DRILLING** ---

LOGGED BY SES **CHECKED BY** KDH **AT END OF DRILLING** ---

NOTES Surface Conditions: 6" asphalt **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					Fill		6" asphalt and 4" crushed rock
0.8							43.2
					SM		Brown silty SAND, very loose, wet
	SS	17	1-1-1 (2)	MC = 18.50% N_{60} = 2			
5							
	SS	33	4-10-6 (16)	MC = 47.30% N_{60} = 12			-becomes medium dense
6.0							-3" wood debris lens 38.0
	SS	78	9-15-23 (38)	MC = 29.60% Fines = 86.00% N_{60} = 29	ML		Gray SILT, dense, wet
7.5							[USDA Classification: LOAM] 36.5
							Boring terminated at 7.5 feet below existing grade due to refusal on obstruction. No groundwater encountered during drilling. Boring backfilled with bentonite.
							Bottom of hole at 7.5 feet.

Earth Solutions NW
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-2

PROJECT NUMBER ES-6876 **PROJECT NAME** Li Residence

DATE STARTED 9/6/19 **COMPLETED** 9/6/19 **GROUND ELEVATION** 44 ft **HOLE SIZE**

DRILLING CONTRACTOR Boretec1, Inc. **GROUND WATER LEVELS:**

DRILLING METHOD HSA **AT TIME OF DRILLING** ---

LOGGED BY SES **CHECKED BY** KDH **AT END OF DRILLING** ---

NOTES Surface Conditions: 5" asphalt **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					Fill		5" asphalt and 3" crushed rock
0.6							43.4
							Gray silty SAND, very loose, wet
	SS	100	1-2-2 (4)	MC = 32.40% Fines = 36.40% N_{60} = 3	SM		[USDA Classification: slightly gravelly sandy LOAM]
5							
5.0							39.0
	SS	44	8-7-6 (13)	MC = 22.70% N_{60} = 10			Gray sandy SILT, medium dense, wet
							-becomes dense
	SS	78	15-26-19 (45)	MC = 23.40% Fines = 53.30% N_{60} = 34			[USDA Classification: slightly gravelly LOAM]
10							-groundwater seepage
	SS	100	18-21-24 (45)	MC = 26.90% N_{60} = 34	ML		
							-becomes silt
15							
	SS	89	12-14-17 (31)	MC = 23.00% Fines = 95.50% N_{60} = 26			[USDA Classification: LOAM]
16.5							27.5
							Boring terminated at 16.5 feet below existing grade. Groundwater seepage encountered at 9.0 feet during drilling. Boring backfilled with bentonite.
							Bottom of hole at 16.5 feet.

Appendix B

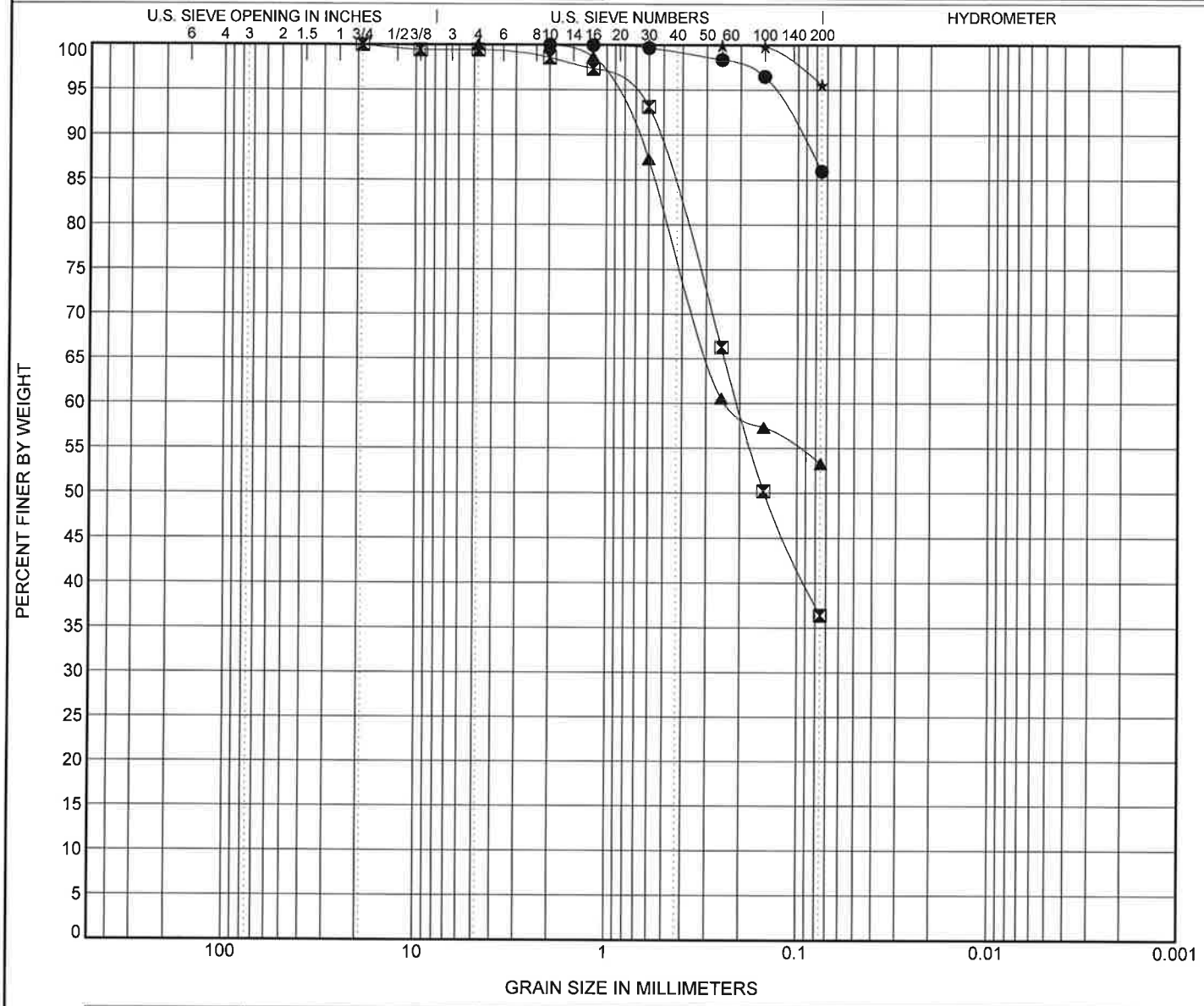
Laboratory Test Results

ES-6876

Earth Solutions NW
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-6876 **PROJECT NAME** Li Residence



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	Cc	Cu
●	TP-01	6.00ft.	USDA: Gray Loam. USCS: ML.		
⊠	TP-02	2.50ft.	USDA: Gray Slightly Gravelly Sandy Loam. USCS: SM.		
▲	TP-02	7.50ft.	USDA: Gray Slightly Gravelly Loam. USCS: Sandy ML.		
★	TP-02	15.00ft.	USDA: Gray Loam. USCS: ML.		

	Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	6.0ft.	2							86.0	
⊠	TP-02	2.5ft.	19	0.205						36.4	
▲	TP-02	7.5ft.	4.75	0.23						53.3	
★	TP-02	15.0ft.	1.18							95.5	

GRAIN SIZE USDA ES-6876 LI RESIDENCE.GPJ GINT US LAB GDT 10/16/19

Report Distribution

ES-6876

EMAIL ONLY

Mr. Qun Li
1472 West Lake Sammamish Parkway Northeast
Bellevue, Washington 98008

CRITICAL AREAS REPORT
SHORELINE FUNCTIONS EVALUATION
FLOODPLAIN FUNCTIONS EVALUATION

Li Residential Property Redevelopment

1472 West Lake Sammamish Parkway NE
Bellevue, Washington

Prepared by:
Cedarock Consultants, Inc.
19609 244th Avenue NE
Woodinville, Washington 98077

Prepared for:
Qun Li
12701 NE 39th Street
Bellevue, Washington 98005

October 17, 2019

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REPORT AUTHOR

This report was prepared by Carl Hadley, a professional aquatic biologist with over 30 years of experience evaluating effects of changing land use on aquatic habitat. Mr. Hadley is the principal biologist with Cedarock Consultants, Inc.

1.0 INTRODUCTION

1.1 Project Description

An existing home located at 1472 West Lake Sammamish Parkway NE (Figure 1) will be razed and replaced with an all new structure. The new structure will be located outside of the 25-foot Lake Sammamish buffer, and landward of an existing, legally established retaining wall. All proposed work will be approximately 5-feet and higher above the ordinary high-water mark (OHWM) of 31.8 feet elevation used by the City of Bellevue as a regulatory line from which to measure buffers for Lake Sammamish. No work is proposed within the Lake Sammamish floodplain (elevation 36.1 feet). Both the existing and proposed homes are located entirely within the Shoreline Management Area (SMA). There is no developable land on the lot that is not within the SMA. No native vegetation will be disturbed, and no other critical areas or habitat will be affected by the proposed action.

Under the proposed action, there will be an increase in the impervious area footprint on the site of 200 sq.ft. All of the footprint is located within previously disturbed areas within critical area setbacks (steep slope and Shoreline Structure Setback). This includes the existing house footprint, other impervious surfaces such as concrete walkways and patios, and a planter box. To reduce impacts, the overall developed footprint will be moved away from the water to include the removal of all existing impervious surface within the 25-foot lake buffer.

The new house will result in a final area of 919 sq.ft. of impervious surface within the Shoreline Structure Setback area. This is a reduction of 40 sq.ft. compared to 959 sq.ft. of impervious footprint under existing conditions. No existing trees or native shoreline vegetation will be disturbed.

The house will not disturb a steep slope located on the property but will be partially located within the 75-foot structure setback from the toe of the slope. The entire setback area was disturbed (cleared and graded with existing asphalt street, house, sidewalk, and a small landscaped planter box) when the site was originally developed some 75 years ago, and no new permanent disturbance is proposed. The risk that the proposed work will increase the risk of soil movement on the steep slope was judged to be "minimal"[1].

Because no new adverse impacts are proposed to critical areas, there is no net change in impacted area within the shoreline or steep slope buffer, and there will be a reduction of 40 sq.ft. of impervious surface within the Shoreline Structure Setback area, no additional mitigation is proposed.

[1] Earth Solutions NW. 2019. Geotechnical engineering study, 1427 W. Lake Sammamish Pkwy NE. Oct. 16, 2019.

1.2 Purpose of this Report

This report was prepared for following purposes:

1. To evaluate environmental effects of the proposed redevelopment on environmental functions within the Lake Sammamish Shoreline environment;
2. To evaluate environmental effects of the proposed redevelopment on Critical Areas, and;
3. To evaluate environmental effects of the proposed redevelopment on floodplain habitat.
4. To describe mitigation needed to offset adverse environmental effects of redevelopment, and that will lead to equivalent or better protection of critical area functions and values.

1.3 Report Author

This report was prepared by Carl Hadley, a professional aquatic biologist with over 30 years of experience in western Washington.

Figure 1. Li property on Lake Sammamish.

2.0 EXISTING CONDITIONS

This section provides a description of shoreline habitat and critical areas on the affected site under existing conditions. Critical areas within 300-feet of the work area include Lake Sammamish, the lake's riparian buffer, steep slopes in excess of 40 percent, and habitat associated with species of local importance (Figure 1). Adjoining properties also include similar critical areas including Lake Sammamish and continuation of the steep slopes.

2.1 Lake Sammamish

A survey of Lake Sammamish in the vicinity of the work area survey was conducted on the morning of September 27, 2019 by a professional biologist. The Li property and adjoining properties are highly modified including houses, retaining walls, docks, slope modifications and landscaping. A dock and the end of a concrete walkway extend waterward of the OHWM on the Li property.

Lake Sammamish is a shoreline of the state (classified as a Type S water under the Bellevue land use code LUC 20.25H.075.B.1). The lake in this area consists of open water that continues uninterrupted offshore for a half mile and more. The gravel dominated substrate drops off slowly to about 8 feet within 50 feet from shore. The property is located in an area subject to high wave action during storm events. The southeast facing shoreline of Lake Sammamish on which the property is located has a fetch of between 3 and 4 miles of open water to the south. Because prevailing storm winds come from the south and southeast, the waves that build up during peak events can exceed 3-feet, with a 2-foot wave not unusual. In addition to the waves, storm surges (seiches) sometimes occur when strong winds cause water to pile up at the north end of the lake. This can raise the water surface elevation by a foot or more.

A concrete retaining wall located near the OHWM line extends across the property and ranges from three to four feet in height above the beach (Figure 2). The landscape below the retaining wall consists primarily of a gravel beach sloped gently down into the water. There are some plants within this area including weedy grasses and small native forbs. A 3-foot wide concrete path leads from a staircase on the beach up across the buffer to the house (Figure 2). An older wooden dock provides access to the lake.

Figure 2. Shoreline conditions on beach (left) and above retaining wall (right) (September 2019).

The remainder of the Lake Sammamish buffer upland of the retaining wall consists of lawn (Figure 2), a few landscaping areas, a three foot-wide at-grade concrete walkway, and a staircase up to the deck. The floodplain elevation of 36.1 feet is located about halfway up to the house. The existing house extends from the lawn/patio back about 50 feet to the access road (NE Rosemont Place). A well-vegetated steep slope extends from the road past the limits of the Shoreline Management Area (Figure 1).

Lake Sammamish has documented fall Chinook, coho, sockeye, and winter steelhead presence. A few native charr have also been noted. Resident cutthroat trout and various warmwater fish species are also known to use Lake Sammamish year-round. No spawning has been observed within or near the project site, but adult salmon migrate through Lake Sammamish to spawning habitat in Issaquah Creek and other tributaries feeding the lake. Juvenile salmon migrate past the site on their journey to Puget Sound. Chinook, steelhead, and bull trout are protected under the federal Endangered Species Act.

2.2 Streams

No watercourses were observed on or near the property. Local and state databases indicate a few minor non-fish-bearing watercourses are somewhere nearby but were probably incorporated into underground conveyances at sometime in the past.

2.3 Wetlands

A cursory examination of the property and a review of public records found no evidence of wetlands on the site. No seeps or wetland plants were noted.

2.4 Geologic Hazard Areas

The property is located on a southeast facing slope immediately adjacent to Lake Sammamish. Starting at OHW, the ground has an average 12 percent slope for the first 105 feet. It is on this part of the property in which the house and access road are located. The toe of a much steeper slope starts at the access road and continues approximately to the west. The steep slope averages about 100% for the first 35 feet and then declines to about 40% to the west property edge (25-feet). Further details can be found in the geotech report for the site[1].

2.5 Species of Local Importance

The wildlife habitat review consisted of a site-specific survey and consultation with the Washington Department of Fish and Wildlife database[2]. The site and surrounding lands have been developed mostly as high-density single-unit residential housing. Although some suitable wildlife habitat for terrestrial and avian species is found in the area, it has all been significantly modified by past clearing, fragmentation, and introduction of non-native landscaping species (e.g. English ivy and Himalayan blackberry). Species that may be expected to be found intermittently on this site are deer, coyote, Douglas and eastern grey squirrels, other assorted rodent species, raptors, woodpeckers, and songbirds. There are many moderate to large conifer and deciduous trees suitable for red-tailed hawk or owl perching on and near the property. All of these trees are located on the steep slopes. No nesting activity by sensitive species is known to have occurred in the recent past. Larger trees in the area may provide short-term perching sites for bald eagles, but none of these are known to be critical nesting or roosting habitat sites. No terrestrial wildlife species listed by the U.S. Fish and Wildlife Service, Washington Department

[2] Washington Department of Fish and Wildlife. 2019. Priority habitat and species map.

of Fish and Wildlife, King County, or City of Bellevue as threatened, endangered, sensitive, critical, or candidate are expected to utilize habitats found on this property.

Chinook and coho salmon are found in Lake Sammamish. Additional description of aquatic species and habitat is provided in Section 2.1.

2.6 Flood Hazard Areas

Land subject to a one-hundred-year flood is present on the property below elevation 36.1 feet. The floodplain area currently consists of the lawn above the retaining wall, and a sand/gravel beach below (waterward of) the retaining wall (Figure 2).

3.0 EFFECTS OF THE PROPOSED ACTION ON SHORELINE FUNCTIONS

The effect of the proposed action on shoreline ecological functions is discussed in this section. Standard shoreline ecological functions include water quality improvements, bank protection, organic material source, and wildlife habitat. Each of these functions is reviewed below for both the pre- and post-redevelopment condition.

In shoreline areas the standard for protection is "no net loss". No net loss means that, following an action, shoreline ecological functions necessary to sustain shoreline natural resources are equivalent to or greater than ecological functions immediately prior to the action. As noted in Ecology guidelines for the Shoreline Management Act, the "no net loss" standard focuses on shoreline ecological functions "as they currently exist"[3]. In this case "as they currently exist" refers to the conditions with the existing house, landscaped yard, patio, dock, retaining wall, and lack of native vegetation anywhere within 120 feet of Lake Sammamish. No net loss does not compare to theoretical, perfect, or undisturbed conditions as may have occurred before the area was developed.

Shoreline habitat in its natural condition performs many functions essential to fish survival and productivity. Vegetation in riparian areas can provide shade and helps maintain cool water temperatures needed by most fish native to the Pacific Northwest. Plant roots stabilize banks, help control erosion and sedimentation, and can offer refuge habitat for juvenile fish. Vegetation creates overhanging cover for fish. Where present, trees and shrubs contribute leaves, twigs, and insects to waterbodies, thereby providing basic food and nutrients that support fish and aquatic wildlife. Large trees that fall can create refuge habitat needed by small fish for cover and protection from predators. Riparian vegetation, litter layers, and soils filter incoming sediments and pollutants, thereby assisting in the maintenance of high water quality needed for healthy fish populations[4].

[3] *See* WAC 173-26-201(2)(c) (no net loss focuses on sustaining "existing shoreline natural resources" and protecting shoreline resources "as they currently exist").

[4] Knutson, K. L. and V. L. Naef. 1997. Management recommendations for Washington's priority habitats: riparian. Washington Department of Fish and Wildlife, Olympia, WA. 181p.

Primary ecological functions provided within the Lake Sammamish shoreline on the project site are described below along with an evaluation of the project impact. Shoreline functions and values are based on WDFW guidelines[5] and other best available science[6]. The discussion is summarized in Table 1.

Existing conditions on the subject property consists of a moderately sloped gravel beach (Figure 2), a moderately sloped terrace on which the existing house, residential landscaping, and access road are located, and a steep slope which has been left in a relatively natural forested condition. There are large trees on the site, all of which are located on the steep slope greater than 120 feet from the lake. No native trees or shrubs are present within 50 feet of the lake on the project site. Vegetation near the shoreline consists of exotic annual and perennial grasses and forbs, the extent of which varies from year to year, some decorative landscaping, and one large weeping willow.

The Lake Sammamish shoreline area is currently developed with a primary structure, deck, car parking, access road, concrete retaining wall, sidewalk, and lawn. The rest consists of graveled beach and forestland. The replacement structure will lie entirely within previously developed areas of the lot and will not affect any of the graveled beach or forestland. No vegetation, with the exception of managed lawn and areas currently maintained as residential landscaping will be eliminated with expansion of the house.

3.1 Water Quality

Vegetation adjacent to a waterbody can improve water quality by filtering pollutants, removing nutrients, and preventing sediment introduction. The water quality function of the existing shoreline area is generally absent. While the beach area periodically contains grasses and forbs, vegetation for the most part is absent or sparse. The beach consists primarily of gravels and sands. These soils absorb some rainfall and surface water runoff coming from nearby slopes but wave action and rapid infiltration means that most water landing on the beach ends up in Lake Sammamish relatively quickly. Any foreign material such as silts and landscaping or roadway chemicals receive minor filtering action by the soils before water reaches the lake.

Re-developing the site will result in the removal of some of the managed landscaping located upland of the house and outside of the lake buffer. Replacement of the garden with impervious surface will have no effect on the quality of runoff from the site. Assuming some chemicals such as fertilizer or herbicides are used on the landscaping, future runoff from the roof will likely be cleaner. However, the overall effects are minor given the absence of significant runoff in the area.

[5] Ibid.

[6] For example, see Citations of Recommended Sources of Best Available Science for Designating and Protecting Critical Areas. 2002. Washington State Office of Community Development, Olympia, WA. and City of Bellevue's 2005 Best Available Science (BAS) Review (Herrera 2005).

Table 1. Standard Lake Shoreline Buffer Functions and Analysis of Change

Buffer Function	Description of Function	Current Buffer Function	Buffer Function After Re-Development
Shade	The ability to help maintain low water temperatures and create a cool and humid microclimate.	**Poor** for the project site due to a lack of significant vegetation (trees and shrubs) overhanging or adjacent to Lake Sammamish.	**No change**
Beneficial Nutrient Sources	The ability to provide food resources to the Lake in the form of leaf litter, vegetative matter, and terrestrial insects.	**Low to non-existent** for the project site due to a scarcity of native vegetation within more than 120-feet of Lake Sammamish.	**No change**
Woody Debris Recruitment	The ability to provide large woody debris to Lake Sammamish.	**Non-existent** for the project site due to a lack of potential recruitment trees near the lake.	**No change**
Sediment and Pollutant Control	The ability to physically filter sediments, chemicals, and nutrients.	**Low due** to a lack of native vegetation and little surface water running off of, or across the site.	**Slight Beneficial Effect** – with reduction of impervious surface near lake.
Bank Stability and Sediment Recruitment	The ability to maintain bank stability and prevent increased erosion along the shoreline of Lake Sammamish.	**Low** due to entirely developed shoreline with armoring needed to protect residences from wave action.	**No change**
Human Access Control	The ability to reduce or eliminate human disturbance along a sensitive shoreline.	**None.** Access control is not an issue for this private property.	**No change**
Wildlife Habitat Suitability	The ability to provide habitat for upland mammals and avian species within the riparian corridor.	**Low to moderate** for the project site. Poor habitat near lake, but northwest half of property is natural forest with moderate wildlife function.	**No change**

Shoreline Buffer Function: The physical, chemical, and biological processes or attributes of the buffer.

3.2 Water Quantity

The project will result in a slight increase of impervious surface and no change in land use. Runoff volume from the site will be about the same. Water from the site drains directly to Lake Sammamish, a very large waterbody. The effect on water surface elevation and flow rate will be discountable.

3.3 Beneficial Nutrients

Native riparian buffers can be important to aquatic habitat productivity being the primary source of leaf litter and insects delivered to fish habitat. When present, overhanging vegetation contributes leaves, vegetative litter, and small woody debris directly to the waterbody.

No trees or shrubs will be removed from the shoreline vegetation management area under the proposed action. The existing willow tree that overhangs the lake will remain. There will be no change in beneficial nutrients being delivered to the lake.

3.4 Microclimate

Riparian vegetation has the ability to protect waterbodies from climate changes caused by widespread development away from the water, including soil and air temperature, humidity, and wind. There is no direct link between microclimate and the condition of salmonid habitat, however, it has been suggested that microclimate needs protection to maintain desirable assemblages of plants and animal species, including insects, beneficial to fish.

No native vegetation will be removed under the proposed action. Upon finishing the new structure, approximately 55 percent of the property will consist of pervious open space most of which will be naturally vegetated. This area is identical to existing conditions. There will be no effect on microclimate.

3.5 Temperature & Shade

No overhanging vegetation will be removed during re-development of the property. The amount of shade will not decrease. No effect on water temperature in Lake Sammamish will occur.

3.6 Human Access Control

One function of buffers in populated areas can be reducing the direct encroachment of humans on the watercourse. This project will be conducted on private property where access control is not an issue.

3.7 Woody Debris

Large and small woody debris consists of downed tree stems and branches and is a functionally important structural component of watercourses and lakes in the Pacific Northwest.

No vegetation capable of supplying woody debris will be removed during re-development of the property.

3.8 Bank Stability

Roots from vegetation growing along waterbodies can help stabilize soils and reduce erosion. The sand and gravel found along the subject shoreline naturally aggrades and erodes with minimal influence of any native plants along the shoreline. A retaining wall currently located at the OHW provides some stability along the upper shoreline area and prevents erosion from around the existing structure. No change is proposed to the retaining wall. Bank stability will not be affected to any significant degree by the proposed re-development.

3.9 Shoreline Function Conclusion

The site is currently developed with an existing residence. Redevelopment consists primarily of replacing the old structure with some minor expansion of the new residence into areas currently utilized as walkways, patio, or landscaping. Forty sq.ft. of structural development currently within the Lake Sammamish buffer will be removed with redevelopment. The developed square footage within the Lake Sammamish shoreline area will increase slightly but only at the cost of a small landscaping area upland of the existing house. No disturbance of natural habitat will occur. With the exception of some temporary grading within currently developed areas of the lake buffer, no work is proposed in sensitive areas. No natural vegetation will be disturbed. Under the Shoreline Management Act, this level of protection will provide "no net loss" of shoreline ecological functions necessary to sustain shoreline natural resources.

4.0 PROJECT EFFECTS ON CRITICAL AREAS

Critical areas are defined in the City of Bellevue under BCC LUC 20.25H.025. They include streams, wetlands, shorelines, geologic hazards, habitat and species of local importance, flood hazard areas, and buffers. Existing conditions of each critical area on or near the site are described in Section 2.0 of this report. This section describes any actions that will be taken within or near the critical area and any proposed changes that will occur.

4.1 Streams and Lakes

There are no streams located on or near the site. Lake Sammamish borders the east side of the property. The proposed redevelopment includes no inwater work, no work below the OHWM, and a permanent decrease in the developed footprint within the buffer and floodplain of 40 sq.ft. All temporary impacts to the buffer due to grading will occur in currently degraded areas. Temporary increased levels of noise and visual disturbances will also occur during construction but will meet City of Bellevue construction standards (BCC 9.18).

4.2 Wetlands

No wetlands, seeps or springs were noted on the site or reported in sensitive areas portfolios.

4.3 Shorelines

Lake Sammamish is a shoreline of the state. Changes to shoreline functions are described in Section 3.0 of this report.

4.4 Steep Slopes

Figure 3 – Existing garden in slope setback.

No work will be completed on the steep slopes found on this site. The steep slope is located on the west side of the access road to the house. The house and all proposed work are located east of the access road. While development is proposed within the steep slope setback, it will occur in an area previously cleared and graded and now used as a garden adjacent to the house (Figure 3). The area provides no support for the slope being flat and on the far side of the access road. Building a house in this area will not affect slope stability (see Geotech Report).

4.5 Species of Local Importance

No habitat that may have provided urban wildlife habitat for species of local importance will be affected by redevelopment of the property. The large patch of vegetation on the steep slope will be left untouched. No native vegetation will be disturbed.

Sensitive fish species are found in Lake Sammamish. However, no spawning or other habitat critical to salmon life history is located on the site. No aquatic habitat will be disturbed as a result of the project.

4.6 Flood Hazard Areas

A flood hazard area is located on the site waterward of the existing house. The only work proposed within the Lake Sammamish floodplain is removal of the existing concrete walkway. Additional discussion is provided in Section 5.0.

4.7 Critical Areas Effects Summary

The proposed action will take place within a footprint that was already entirely modified for the existing use as a residence (Table 2). No temporary or permanent adverse changes to natural habitat will occur. Work will temporarily affect parts of the Lake Sammamish buffer that have already been significantly cleared, graded, and/or developed. Minor excavation in the floodplain is proposed as part of restoration activities. All impacts will be small, temporary and will occur

in areas of existing lawn, planters, and pavement. No significant adverse effects on critical areas are expected.

Table 2. Critical Area Impacts

Location of Impact	Impact Areas		
	Existing	Future	Change
Streams	0	0	0
Stream Buffers	0	0	0
Wetland	0	0	0
Wetland Buffer	0	0	0
Shoreline (within 200 feet of el. 31.8)	1,605 sq.ft. [1] 1,825 sq.ft. [2]	1,825 sq.ft. [1] 1,825 sq.ft. [2]	200 sq.ft. [1] 0 [2]
Lake Sammamish Buffer (within 25 feet of OHWM)	144 sq.ft. [1]	0 sq.ft. [1]	-144 sq.ft.
Shoreline Structure Setback (0-50 feet from OHWM)[3]	959 sq.ft. [2]	919 sq.ft. [2]	-40 sq.ft.
Steep Slope	0 sq.ft.	0 sq.ft.	0
Steep Slope Setback	1,644 sq.ft.[2, 3]	1,644 sq.ft. [2, 3]	0
Flood Hazard Area Volume	--	--	0 cu.ft

[1] Impervious surface consisting of concrete paths, patios, and house (LUC 20.25E.065)
[2] Permanent disturbance to include impervious surface (above) plus non-native landscaped areas (LUC 20.25H.125)
[3] Includes the Vegetation Conservation Area (LUC 20.25E.065.F)

5.0 EFFECTS OF THE PROPOSED ACTION ON FLOODPLAIN HABITAT

The area below 36.1 feet in elevation has been designated by the City of Bellevue as the Lake Sammamish floodplain. The top of the existing vertical concrete retaining wall is at approximately elevation 35.0 feet. The only work proposed within the Lake Sammamish floodplain is associated with compensatory mitigation and includes removing a concrete pathway. A small increase in floodplain capacity will result.

6.0 MITIGATION

Under the proposed action there will be no new permanent disturbance and no loss of native trees or other native vegetation. The project will reduce impervious surface within the Lake Sammamish shoreline buffer by 144 sq.ft. with removal of a concrete walkway and will reduce impervious surface within the Vegetation Conservation Area by 40 sq.ft. The building will expand into an area that already lacks any significant natural biological function being comprised entirely of existing building, pavement, and a managed garden. No significant adverse environmental effects of the project on sensitive areas or shoreline ecological functions are expected.

Mitigation for the project is being provided primarily by avoiding and/or minimizing sensitive areas that are present on the site. Additional intrusion into the steep slope set-back area by the house is being mitigated by removing impervious surface in the shoreline area.

6.1 Impact Avoidance

The following actions are proposed to avoid impacts:

- No work is proposed below the ordinary high water mark of Lake Sammamish.
- No work is proposed waterward of the existing retaining wall.
- No work is proposed in wetlands, streams, or geologic hazard areas, or their buffers.
- No fill is proposed within the floodplain.
- No native vegetation within the shoreline area or any buffer will be disturbed.

6.2 Impact Minimization

The following actions are proposed to minimize impacts:

- Work within the Lake Sammamish shoreline buffer and setback will be temporary and limited only to areas of existing disturbance (lawn, pavement, and the existing house).
- Work in the steep slope setback will be limited to a previously graded area on the far side of the access road that now serves as a vegetable garden.

6.3 Compensatory Mitigation

The following actions are proposed to mitigate for impacts:

- 144 sq.ft. of existing concrete walkway and patio will be removed from the shoreline buffer area (no new development is proposed in this area).
- A net reduction of 40 sq.ft. of impervious surface is proposed for the shoreline building setback area (Vegetation Conservation Area).

All of the compensatory mitigation is proposed in the area closest to Lake Sammamish. No vegetation will be removed from this area.

6.4 Mitigation Summary and Conclusion

The mitigation plan was prepared specifically to avoid impacts to critical areas with some compensatory mitigation being provided to achieve a new reduction of impervious surface in the shoreline buffer area (Table 3). Overall habitat quality would remain in the current state without significant change.

Table 3. Impact and Mitigation Areas

Impact (sq.ft.)	Mitigation (sq.ft.)	Description
919		Construction of new Single Family Residence (SFR) in building setback area
	834	Removal of existing SFR from building setback area
	135	Removal of existing concrete walkway and patio from building setback area and shoreline buffer area (replaced with lawn)
919	**959**	**Conclusion: Mitigation area exceeds impacted area by 4%**

IMPACT ANALYSIS

Steep Slope Toe (75') - Area of Disturbance

Existing	Proposed	Change
3713.3	3713.3	0

Shoreline Structure Setback (50') - Impervious Surface

Existing	Proposed	Change
959.4	919.5	-39.9

EXISTING IMPERVIOUS SURFACE TO BE REMOVED

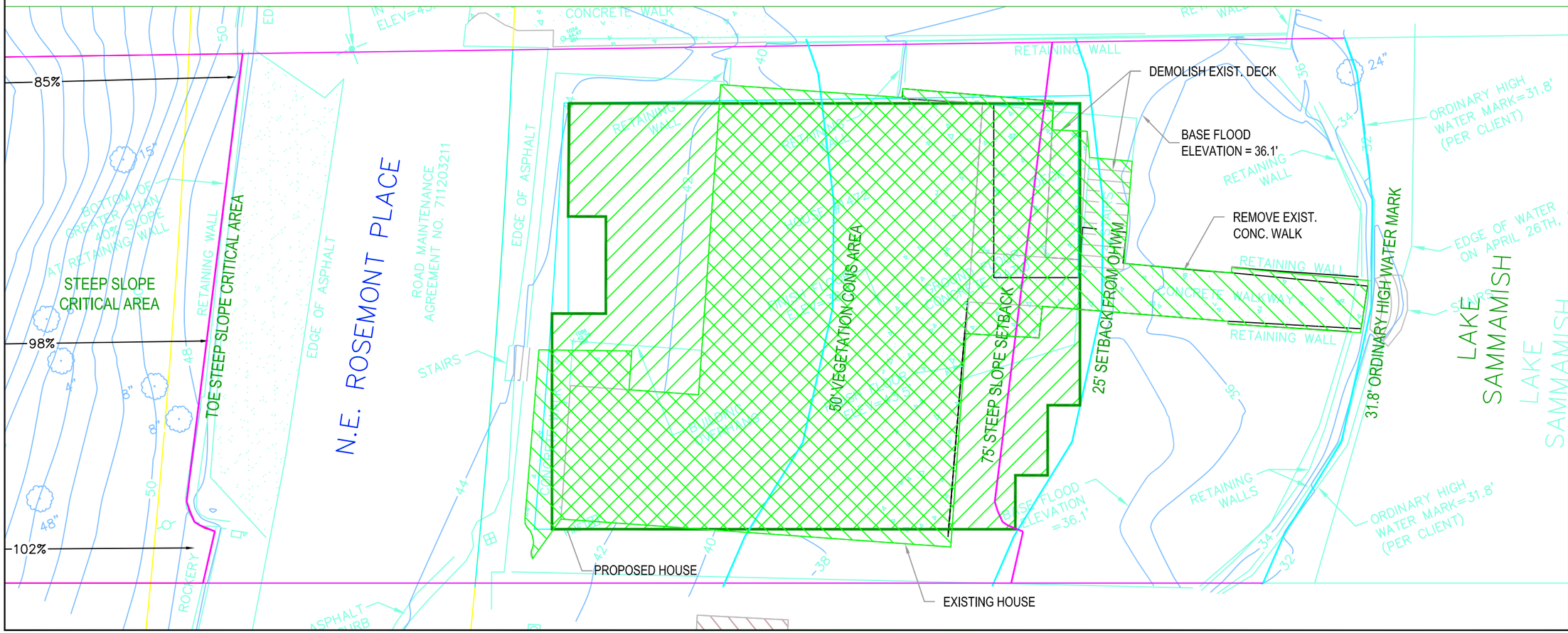
EXISTING IMPERVIOUS SURFACE TO BE REPLACED

NEW IMPERVIOUS SURFACE

N

0 10 20

HORIZONTAL SCALE



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LI-ZHENG PROPERTY

1472 West Lake Sammamish Pakway NE

CRITICAL AREA IMPACTS PLAN

Design: CGH
Drawn: CGH
Filename: LI MITIGATION

Date: 10-15-19

Sheet No. 1

No 1 of 1 Sheets